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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SMITH INTERNATIONAL PATENT APPLICATIONS
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EXAMINER	
MCNELIS, KATHLEEN A	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 10/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/494,877	FANG ET AL.	
	Examiner	Art Unit	
	Kathleen A. McNelis	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7,11-21,25-27,29,32-34,37 and 41-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,11-21,25-27,29,32-34,37 and 41-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claims Status

Claims 1-5, 7, 11-21, 25-27, 29, 32-34, 37 and 41-44 remain for examination wherein claims 1, 33 and 43 are amended.

Acknowledgement of RCE

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CRF 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.115, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/31/2006 has been entered.

Status of Previous Rejections

The previous rejection of claims 1-5, 7, 10-21, 25-27, 29, 32-34, 37 and 40-44 under 35 U.S.C. 103(a) as unpatentable over Heinrich et al. in view of Fujita et al. '696 is withdrawn in view of applicant's amendments to the claims and arguments.

Examiner's Comments

There appears to be a typographical error in claim 19: "..as recited in claims 15, 16, 17 and 19." Examiner has assumed that this should read "..as recited in any of claims 15, 16, 17 or 19" and suggests correction of this error. Otherwise, Claim 19 and all depending claims will be objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n).

DETAILED ACTION

Claim Rejections - 35 USC § 102

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 4, 7, 14, 15, 17, 19, 20, 25-27, 32, 33, 37, and 41-43 are rejected under 35 U.S.C. 102(a) or 102 (e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fang et al. (U.S. Pat. No. 5,880,382) in view of AMETEK Sealvar® Tech Brief (AMETEK).

Fang et al. discloses a low coefficient of thermal expansion (CTE) cermet (col. 7 lines 5-10 and col. 4 line 46-55) comprising a carbide (i.e. first phase) of a W, Ti, Mo, Nb, V, Hf, Ta or Cr with a ductile phase binder (i.e. second phase) selected from the group of Co, Ni, Fe and alloys with C, B, Cr, Si and Mn (abstract). Fang et al. discloses that the ductile binder phase is selected from Fe-Ni-Co alloys having low CTE, desirably less than 8 μm/m K (i.e. ppm/K or ppm/°C), which is within the claimed range of less than about 10 ppm/°C (col. 7 lines 10-19).

In example 7, Fang et al. discloses that the binder is 30% by volume Sealvar (col. 12 lines 45-60), which according to the AMETEK tech brief has nominally 31% Ni, 15% Co, 0.07% Mn, 0.01% C, minor alloying additions of additional elements, balance Fe (Chemical Composition). The alloy is essentially a blend of Fe, Co, Ni, C and Mn, since only maximum limits are given for the additional minor alloying elements (i.e. no required minimum amounts). The AMETEK tech brief discloses that the alloy is 5.5 ppm/°C or less, which is within the claimed range of less than 10 ppm/°C (claims 1 and 25) and 6 ppm/°C (claim 33).

While Fang et al. does not disclose that the binder comprises between 10 and 30% by weight (claim 1), such would be the case given the relative densities of WC vs. Fe-Co-Ni alloys and since the binder is 30% by volume.

Alternatively, while Fang et al. does not disclose that the binder comprises between 10 and 30% by weight, one of ordinary skill in the art would expect this to be the case given the relative densities of WC vs. Fe-Co-Ni alloys and since the binder is 30% by volume.

With respect to claims 2 and 4, Fang et al. discloses WC and TiC (col. 5 lines 26-41). With respect to claims 7 and 37, AMETEK discloses that the alloy is nominally 31% Ni, which is within the claimed range of 10 to 40%.

Claim 25 is a product by process claim and as such is not limited by or defined by the process disclosed. The patentability does not depend on the method of production, but rather on the product itself. If the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made using a different process (See M.P.E.P. 2113).

Fang et al. discloses a low CTE cermet (col. 7 lines 5-10) comprising a carbide (i.e. first phase) of W, Ti, Mo, Nb, V, Hf, Ta or Cr, with a ductile phase binder (i.e. second phase) selected from the group of Co, Ni, Fe and alloys with C, B, Cr, Si and Mn and a second ductile phase (i.e. third phase) of Co, Ni, Fe, W, Mo, Ti, Ta, V, Nb and alloys thereof with C, B, Cr and Mn, and additionally having carbide, nitride and boride additives in the ductile phase (abstract). Fang et al. discloses that the ductile binder phase is selected from Fe-Ni-Co alloys having low CTE, desirably less than 8 μm/m K (i.e. ppm/K or ppm/°C) which is within the claimed range of less than about 10 ppm/°C.

While Fang et al. does not recite that the first and second phases form particles that are dispersed within the third phase, Fang et al. teaches that carbides, nitrides and borides can be added to the second ductile phase to improve wear resistance (abstract), for dispersion strengthening, and that such additives, ranging in size from submicron to a few microns in size, form a uniform dispersion throughout the binder phase (col. 8 lines 21-43) which would be essentially the same or substantially similar to products formed from reactions between elements in the first and second phases.

Alternatively, while Fang et al. does not recite that the first and second phases form particles that are dispersed within the third phase, one of ordinary skill in the art would expect the product produced by adding carbides, nitrides and borides for dispersion strengthening, ranging in size from submicron to a few microns in size, form a uniform dispersion throughout the binder phase to produce a product essentially the same or similar to that formed from reactions between elements in the first and second phases.

With respect to claims 14 and 41, Fang et al. is applied as discussed above regarding claim 1. Further, while Fang et al. does not recite that the CTE is less than that of conventional WC-Co at the same temperature and having the same metal content at a temperature range of from 100 to 700 °C, such would be expected since the composition of the first and second phases disclosed in Fang et al. are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claims 15 and 17, Fang et al. discloses WC and TiC (col. 5 lines 26-41). With respect to claim 19, AMETEK discloses that the alloy is nominally 31% Ni, which is within the claimed range of 10 to 40%. With respect to claim 20, The AMETEK tech breif discloses that the alloy is 5.5 ppm/°C or less, which is within the claimed range of less than 10 ppm/°C.

With respect to claims 26 and 27, the AMETEK tech brief discloses that the alloy CTE is 5.5 ppm/°C or less, which is within the claimed range of less than 6 ppm/°C. With respect to claim 29, the AMETEK tech brief discloses that the alloy is nominally 15% Co (within the range of 10 to 30%) and 31% Ni (within the range of 10 to 40%). While Fang et al. does not disclose that the binder comprises between 1 and 30 wt % (claim 32), such would be the case given the relative

densities of WC vs. Fe-Co-Ni alloys, since the binder is 30% by volume (i.e. would expect less than 30% by weight because density of WC is higher).

With respect to claim 42, while Fang et al. does not recite that the CTE is less than that of conventional WC-Co at the same temperature and having the same metal content at a temperature range of from 100 to 700 °C, such would be expected since the composition of the first and second phases disclosed in Fang et al. are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claim 43, Fang et al. discloses WC carbides in contact with a binder material as discussed above regarding claim 1. Further, Fang et al. shows schematically a repeating arrangement of first (20) and second (22) structural phases (Fig. 4).

Claims 11-13, 21, 34 and 44 are rejected under 35 U.S.C. 103(a) as obvious over Fang et al. (U.S. Pat. No. 5,880,382) in view of AMETEK Sealvar® Tech Brief (AMETEK) as applied to claims 1, 33 and 43.

Fang et al. in view of AMETEK is applied as discussed above regarding claim 1.

Further, although Fang et al. does not disclose that the CTE difference between the binder and first phase grains is less than about 5 ppm/°C (claim 11) or 2 ppm/°C (claims 12, 21, 34 and 44), such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claim 13, Fang et al. discloses forming roller cone rock bit inserts with the composition (col. 9 lines 24-45) which one of ordinary skill in the art would expect could be used

with a rock bit comprising a body having a number of legs and cutting cones on the end of each leg with a plurality of cutting inserts.

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as obvious over Fang et al. (U.S. Pat. No. 5,880,382) in view of AMETEK Sealvar® Tech Brief (AMETEK) as applied to claims 1 and 14 and further in view of Heinrich et al. (U.S. Pat. No. 6,024,776).

Fang et al. in view of AMETEK is applied as discussed above regarding claims 1 and 14.

Fang et al. in view of AMETEK do not disclose using TiC-TiCN cermet material.

Heinrich et al. discloses cermets in Co-Ni-Fe binder (abstract) wherein either WC or TiC-TiCN is used as a hard component (col. 3 lines 17-31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use TiC-TiCN as taught by Heinrich et al.in the cermet of Fang et al. since Heinrich et al. teaches that TiC-TiCN can be used in place of WC in a similar composition.

Claims 1-4, 7, 11, 12, 14-17, 19-21, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Great Brittan patent 1 450 654 (GB '654) in view of European Patent 0 085 125 (EP '125).

With respect to claims 1 and 14, GB '654 discloses cemented carbides of tungsten carbide (WC) with an alloy consisting of 8-20% by weight Ni, 5-15% by weight Co, 0.8 – 1.4 wt% C, balance Fe, where the WC particles are from 91 to 97 wt% of the total composition. The range of between 5-15% Co overlaps the claimed range of from 10 to 30%. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use between 10 and 15% Co in the alloy composition since GB '654 discloses equal utility over the range of 5-15% (see M.P.E.P § 2144.05). Further, GB 654 discloses and example composition of 90% WC, 1% TaC, and 9% binder, where the binder consists of Fe, Ni, Co and C, with 10% Co.

GB '654 does not disclose that the binder comprises from 10 to 30 % of the total weight of the cermet, however GB '654 discloses an example where the binder is 9% as discussed above. The binder composition of 9% is close enough to the claimed range of between 10 and 30% that one of ordinary skill in the art would expect the same results, therefore a prima facie case of obviousness exists (see M.P.E.P § 2144.05).

GB '654 does not disclose that manganese is present in the binder.

EP '125 discloses cemented carbide compositions (title) having Ni, Fe, C binders (Tables I and II) with Mn added (Table II and Example III). EP '125 teaches that manganese provides a highly desirable hardening transformation during cold working, which improves abrasion resistance (p. 3 lines 25-44). Improved abrasion (i.e. wear) resistance is desired in GB '654 (p. 1 lines 72-80). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Mn as taught by EP '125 to the binder of GB '654 to benefit from improved wear resistance as taught by EP '125 and desired in GB '654.

While GB '654 in view of EP '125 does not disclose that the binder alloy has a CTE of less than about 10 ppm/°C (claim 1), such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claim 14, GB '654 in view of EP '125 is applied as discussed above regarding claim 1. Further, while GB '654 in view of EP '125 does not recite that the CTE is less than that of conventional WC-Co at the same temperature and having the same metal content at a temperature range of from 100 to 700 °C, such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially

similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claims 2 and 15, the GB '654 discloses that the first phase is WC as discussed above regarding claim 1. With respect to claims 3, 4, 16 and 17, GB '654 teaches that WC-TiC-TaC or pure TiC are used for ferrous alloy metal cutting applications (p. 1 lines 28-39). With respect to claims 7 and 19, GB '654 discloses a range of 8-20% by weight Ni, which overlaps the claimed range of between 10 and 40%, and example alloys with 15% Ni (Table III). With respect to claims 11, 12, 20, and 21, although GB '654 in view of EP '125 does not disclose that the CTE difference between the binder and first phase grains is less than about 5 ppm/°C (claim 11) or 2 ppm/°C (claims 12, and 21), or that the binder phase has a CTE less than 10 ppm/°C (claim 20), such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claim 43, GB '654 in view of EP '125 is applied as discussed above regarding claim 1. Further, GB '654 discloses carbides of groups IV, V and VI of the periodic table (p. 1 lines 7-27), and ball milling the powder mixture of the carbide and ductile phases (pp. 2-4) so that the two phases are in contact, and would be expected to form a repeating arrangement of structural units.

With respect to claim 44, although GB '654 in view of EP '125 does not disclose that the CTE difference between the binder and first phase grains is less than about 2 ppm/°C (claim 44), such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art

teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

Claims 13, 33, 34, 37, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Great Brittan patent 1 450 654 (GB '654) in view of European Patent 0 085 125 (EP '125) as applied to claim 1, and further in view of Great Brittan patent 2 273 301 (GB '301) or Liang et al. (U.S. Pat. No. 6,197,084) or Fang et al. (U.S. Pat. No. 5,880,382).

GB '654 in view of EP '125 is applied as discussed above regarding claim 1. Further, both GB '654 and EP '125 disclose improved wear resistance as discussed above regarding claim 1, and EP '125 teaches that the composition is advantageously used in applications including rock drilling (p. 3 lines 33-37).

GB '654 in view of EP '125 does not teach that the composition is used as cutting inserts disposed in cutting cones of a rock bit as in instant claims 13 or 33.

It is known in the art of rock bit production to use inserts comprising carbides cemented with Co, Ni and/or Fe binder, as evidenced by GB '301 which teaches wear resistance (abstract) or Liang which teaches thermal fatigue and shock resistance (abstract and col. 2 lines 17-42) or Fang et al. which teaches a combination of fracture toughness and wear resistance (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce rock bit inserts as taught by GB '301 or Liang or Fang et al. from the composition disclosed by GB '654 in view of EP '125, since this type composition is desirable in rock bit inserts for wear resistance as taught by GB '301 or thermal fatigue and shock resistance as taught by Laing or combined fracture toughness and wear resistance as taught by Fang et al.

While GB '654 in view of EP '125 and GB '301 or Liang or Fang et al. does not disclose that the binder alloy has a CTE of less than about 6 ppm/°C (claim 33), such would be expected

since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claim 34, although GB '654 in view of EP '125 does not disclose that the CTE difference between the binder and first phase grains is less than about 2 ppm/°C (claim 34), such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II). With respect to claim 37, GB '654 discloses a range of 8-20% by weight Ni, which overlaps the claimed range of between 10 and 40%, and example alloys with 15% Ni (Table III).

With respect to claims 41 and 42, while GB '654 in view of EP '125 does not recite that the CTE is less than that of conventional WC-Co at the same temperature and having the same metal content at a temperature range of from 100 to 700 °C, such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

Claims 25-27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Great Brittan patent 1 450 654 (GB '654) in view of European Patent 0 085 125 (EP '125) and Fang et al. (U.S. Pat. No. 5,880,382).

GB '654 in view of EP '125 is applied as discussed above regarding claim 1. Further, both GB '654 and EP '125 disclose improved wear resistance as discussed above regarding claim 1, and EP '125 teaches that the composition is advantageously used in applications including rock drilling (p. 3 lines 33-37). Further, both GB '654 and EP '125 disclose improved wear resistance as discussed above regarding claim 1, and EP '125 teaches that the composition is advantageously used in applications including rock drilling (p. 3 lines 33-37).

GB '654 in view of EP '125 does not disclose that the composition includes a third phase of materials selected from the Markush group recited in instant claim 25.

Fang et al. discloses a double cemented carbide composition having a carbide phase, a first ductile phase selected from the group consisting of Co, Ni Fe and alloys thereof with C and Mn and a second ductile phase selected from the group consisting of Co, Ni, W, Mo, Ti, Ta, V, Nb, alloys thereof and alloys with materials selected from the group consisting of B, Cr and Mn and where carbides, nitrides and borides can be added to the second ductile phase to improve wear resistance (abstract). Fang et al. teaches that the double cemented carbide improves fracture toughness without sacrificing wear resistance, which is beneficial in applications such as rock bits (col. 2 lines 6-21). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use two ductile phases as taught by Fang et al. in the composition of GB '654 in view of EP '125 to improve fracture toughness without sacrificing wear resistance as taught by Fang et al.

Fang et al. discloses that the ductile binder phase is selected from Fe-Ni-Co alloys having low CTE, desirably less than 8 μm/m K (i.e. ppm/K or ppm/°C) which is within the claimed range of less than about 10 ppm/°C.

While GB '654 in view of EP '125 in view of Fang et al. does not disclose that the first and second phases form particulates that are dispersed in the third phase, Fang et al. teaches that carbides, nitrides and borides can be added to the second ductile phase to improve wear resistance (abstract), for dispersion strengthening, and that such additives form a uniform dispersion throughout the binder phase (col. 8 lines 21-43) which one of ordinary skill in the art would expect to be the same or substantially similar to products formed from the first and second phases.

With respect to claim 26, while GB '654 in view of EP '125 and Fang et al. does not recite that the CTE is less than that of conventional WC-Co at the same temperature and having the same metal content at a temperature range of from 100 to 700 °C, such would be expected since the composition of the first and second phases disclosed in GB '654 in view of EP '125 are the same or substantially similar as the claimed invention. When prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present (see M.P.E.P. 2112.01 II).

With respect to claim 27, the range of less than 8 μm/m K (i.e. ppm/K or ppm/°C) overlaps the claimed range of less than 6 ppm/°C, therefore the range is obvious (M.P.E.P § 2144.05). With respect to claim 29, GB '654 discloses an alloy with 10% Co (within the range of 10 to 30%) and 15% Ni (within the range of 10 to 40%) (Table III, page 4). With respect to claim 32, GB '654 discloses an example with binder content of 9 % (Table III, page 4), which is within the claimed range of between 1 and 30%.

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as obvious over Great Brittan patent 1 450 654 (GB '654) in view of European Patent 0 085 125 (EP '125) as applied to claims 1 and 14 and further in view of Heinrich et al. (U.S. Pat. No. 6,024,776).

GB '654 in view of EP '125 is applied as discussed above regarding claims 1 and 14.

GB '654 in view of EP '125 does not disclose using TiC-TiCN cermet material.

Heinrich et al. discloses cermets in Co-Ni-Fe binder (abstract) wherein either WC or TiC-TiCN is used as a hard component (col. 3 lines 17-31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use TiC-TiCN as taught by Heinrich et al in the cermet of GB '654 in view of EP '125 since Heinrich et al. teaches that TiC-TiCN can be used in place of WC in a similar composition.

Response to Arguments

Applicant's arguments with respect to claims 1-5, 7, 11-21, 25-27, 29, 32-34, 37 and 41-44 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571 272 3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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